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# AN IMPROVED METHOD OF GLAZING FISH FOR LOCKER STORAGE[1/]

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The glazing of fish by the usual method when prepared for storage in locker plants has been reported to be very expensive from the standpoint of both time and labor. The extra handling involved in applying the glaze is also an inconvenience to the operators. For this reason, the glaze is very often omitted.

Although the need for a glaze on properly wrapped fish to be held for relatively short storage periods is questionable, it does have advantages when the fish are stored for extended periods, particularly for fish which because of their shape cannot be tightly wrapped. Possibly if glazing could be simplified to some extent, it would be practiced more widely by locker operators.

The usual means of glazing requires waiting for the fish to freeze, then dipping in cold water several times to form a glaze, and packaging. A method has been suggested by a west coast locker plant operator which overcomes this extra handling and inconvenience. The unfrozen fish are first wrapped in vegetable parchment, the package is then soaked in cold water for a few seconds, and is immediately wrapped in moisture-vapor-proof material. It was claimed that much of the water is retained within the package which upon freezing forms a rather heavy glaze around the fish. Because of certain merits which this method appeared to possess, small scale tests were conducted with it at the Service's laboratory at College Park, Maryland.

Small striped bass which were obtained in a local market were used for the tests. They were pan dressed in the laboratory and divided into three groups for preparation prior to final freezing. Group A consisted of unfrozen fish which were first loosely wrapped in a type of vegetable parchment which would absorb water and yet retain its strength when wet. The wrapped fish were then immersed in cold water long enough to permit the water to flow inside the wrapper. After removal from the water, a moisture-vaporproof wrapper was immediately applied over the parchment. The fish in group B were frozen first without wrapping. They were given an ice glaze and wrapped in moisture-vaporproof material. Group C was composed of unfrozen fish which were only wrapped in moisture-vaporproof material and not glazed.

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After packaging, the fish in all groups were held at a temperature of -15° F. until thoroughly frozen and were stored at 0° F. Examinations were made at monthly intervals for quality and general appearance of the fish. Volatile acid numbers, a chemical index used to some extent to express numerically the relative freshness of fish, were determined at appropriate intervals. The volatile acid number increases as the freshness decreases.

No marked differences were noted in quality until the fifth month of storage, when the fish in groups B and C showed signs of desiccation in the belly cavity. This condition was more pronounced at the examination after six months. In addition, the skin of the fish in group C was somewhat dry. At this time, the fish in group A were well glazed and had an excellent appearance. Only slight differences in volatile acid numbers (Table 1) were apparent.

TABLE 1.--Volatile acid numbers for striped bass held in storage at 0° F.

| Group | Volatile acid number | | | |
|---|---|---|---|---|
| | Months in storage | | | |
| | Initial* | 6 | 9 | 12 |
| A | 4.6 | 6.8 | 7.9 | 10.6 |
| B | 4.6 | 7.0 | 9.1 | 12.8 |
| C | 4.6 | 8.0 | 16.6 | 39.5 |

* Composite sample taken from fish in each group.

This desiccation increased over the next three months. At the end of nine months, the fish in groups B and C were rather badly desiccated in the belly cavity. In addition, the skin of the fish in group C was badly dried out and there was considerable yellow discoloration. The fish in group A were still well glazed at this time, with good color and no signs of desiccation. Differences in volatile acid numbers became more pronounced.

During the next three months of storage, the fish in groups B and C became more desiccated and discolored, with the development of a strong fishy odor for group B and a very bad odor for the fish in group C. Group A fish continued to show no signs of desiccation and after 12 months of storage were still well coated with an ice glaze, the color was good and the odor was somewhat fishy but not objectionable. Volatile acid numbers at this time showed rather marked differences, particularly for the fish in group C.

Wrapping the fish in vegetable parchment, dipping in cold water, and applying a moisture-vaporproof wrapper over the parchment before freezing, showed a decided advantage in maintaining a glaze over the other methods of preparation used in these tests. Because of the excess water retained by the parchment wrapper, a heavy glaze was formed in the belly cavity and over the entire fish upon being frozen. The need of prior freezing and the extra handling involved in glazing after freezing was eliminated. Also, a close fitting package could be obtained by having the fish in an unfrozen condition at the time the outer moisture-vaporproof wrapping was applied. Although the fish in group C were also unfrozen at the time of wrapping, there was no glaze and localized desiccation occurred in the belly cavities.

While total moisture losses from the packages were quite small, as shown by periodic weighings, sufficient moisture was lost from the skin surface of the fish in group C to cause a very dried out appearance. Freezing the fish before glazing and wrapping (group B) made it impossible to apply the wrapper without leaving considerable air space inside the packages, so that the solid glaze gradually disappeared from the fish and formed as frost within the package, particularly in the belly cavity.

These tests, though limited in scope, showed a definite advantage in maintaining quality and reducing handling, in first wrapping with vegetable parchment and dipping in water prior to the final wrapping and freezing. This method of preparation would appear to be particularly adapted to locker plants and home freezers for use where in most cases the fish that are handled are small enough to be readily packaged. Under certain conditions it may also be applicable to storage in warehouses.

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